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in the preceding chapter, methods of measurement are described, but of course they are much less satisfactory. This is a difficulty that in part inheres in the more complex phenomena that are to be measured, but also in part in the fact that physiologists have failed to cultivate as they might this fertile and enticing field. One might wish for a softening of the teleological terminology, as in p. 129 and p. 143; whether there is or is not an ultimate teleology, it seems wiser to discard its vocabulary. It seems to the reviewer that expressions implying purpose are in part responsible for the disfavor in which ecology is sometimes held. The close of this chapter is devoted to a consideration of experimental evolution, and a full account is given of natural, habitat, and control cultures.

The final chapter considers plant formations, and their study is based on the quadrat method, much of which the author has previously published. Among the subjects here treated are cartography, photography, and formation herbaria. The discussion of the development and structure of vegetation is much like a separate treatise on the same subject already reviewed in these pages. Methods for the study of succession and competition are given. At the close is a helpful glossary.

One can scarcely praise this work too much; it is what is needed to prevent ecology from falling into a swift and merited disfavor. If read and pondered, it will prevent the thoughtless from entering the ecological field, and it will serve the higher end of directing the thoughtful as to the methods of procedure.—H. C. COWLES.

MINOR NOTICES.

THE ADMIRABLE illustrations of vegetation issued by KARSTEN and SCHENCK have frequently been noted in the GAZETTE. A somewhat similar idea has been pursued by WETTSTEIN,[2] who has issued reproductions of a large number of the Brazilian photographs secured by F. VON KERNER and himself on their recent journey to South America. There are fifty-eight plates in phototype, four colored plates, and six text figures. In nearly every instance the original photographic work and the subsequent reproductions have been admirable, and one who has never visited the Brazilian tropics may yet gain herefrom an accurate idea of their general appearance. Not only are there illustrations from the tropical and subtropical rainy forests, but the savannas and the mountains are figured as well.—H. C. COWLES.

SCOTT[3] has given an exceedingly interesting and comprehensive account of the recent development of knowledge in reference to the seed plants of the Carboniferous. It will prove very useful to those who have neither the time nor the opportunity to read the more extensive and scattered papers that deal with the subject.—J. M. C.

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[2] WETTSTEIN, R. VON, Vegetationsbilder aus Südbrasilien. Leipzig and Vienna. 1904.

[3] SCOTT, D. H., The early history of seed-bearing plants, as recorded in the Carboniferous flora. The Wilde Lecture. Manchester Memoirs **49**: no. 12. pp. 32. *pls. 3.* 1905.

THE SECOND and concluding part of the second supplement (1896–1900) of the *Kew Index* has appeared.[4] A notice of the first part appeared in BOT. GAZETTE **39**:68. 1905. The second part includes the letters L–Z, and also six pages of corrections and additions.—J. M. C.

NOTES FOR STUDENTS.

THE PROBLEM OF HEREDITY.—THIS important contribution[5] is similar in plan to the famous *Cytologische Studien aus dem Bonner Institut* which played such an important part during the centrosome controversies. The present work deals with the problem of chromatin reduction and with theoretical considerations connected with this problem. STRASBURGER[6] writes on typic and allotypic[7] nuclear division, ALLEN on the behavior of the nuclear substance during synapsis in the pollen mother-cells of *Lilium canadense*, MIYAKE on the reduction division in the pollen mother-cells of certain monocotyledons, and OVERTON on the reduction division in the pollen mother-cells of certain dicotyledons.

The four writers agree that the nuclear network consists of both linin and chromatin, and all but ALLEN describe a reducing or qualitative division of the chromatin during the first mitosis in the pollen mother-cell.

STRASBURGER studied various pollen mother-cells and also the megaspore mother-cells, all of which are drawn from nuclei of the ovary walls and placenta of *Galtonia candicans* and *Funkia Sieboldiana*. His figures represent close series from the resting stage to telophase. Considerable variation in the number of chromosomes was found in both forms. The bearing of this fact upon the theory of the individuality of the chromosomes is discussed, and the conclusion is reached that the number of chromosomes is fixed by heredity, but not within such rigid limits as to exclude some variation in vegetative cells. The definite

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[4] Index Kewensis plantarum Phanerogamarum: supplementum secundum nomina et synonyma omnium generum et specierum ab initio anni MDCCCXCVI usque ad finem anni MDCCCC complectens. Ductu et consilio W. T. Thiselton-Dyer confecerunt herbarii horti regii botanici Kewensis curatores. Leucocoryne–Zygostates et emendanda addenda. Pp. 105–204. Oxford: Clarendon Press. 1905. 12*s*.

[5] STRASBURGER, E., ALLEN, C. E., MIYAKE, K., and OVERTON, J. B., Histologische Beiträge zur Vererbungsfrage. Jahrb. Wiss. Bot. **42**:1–153. *pls. 1–7*. 1905.

[6] STRASBURGER, E., Typische und allotypische Kernteilung. Jahrb. Wiss. Bot. **42**:1–70. *pl. 1*. 1905.

[7] By typic divisions are understood the ordinary vegetative or somatic divisions; the allotypic divisions are the two divisions usually called the heterotypic and homotypic divisions. The term allotypic is equivalent to the term maiotic as used by FARMER. STRASBURGER would restrict the term atypic to pathological mitosis.